DOCUMENT RESUME

ED 430 868 SO 030 513

AUTHOR	Bierschenk, Bernhard
TITLE	Informational Interaction with Model-Societies of Different Theoretical Orientation. No. 63.
INSTITUTION	Lund Univ. (Sweden). Cognitive Science Research.; Copenhagen Univ. (Denmark). Competence Research Centre.
ISSN	ISSN-0281-9864
PUB DATE	1997-00-00
NOTE	32p.
AVAILABLE FROM	Copenhagen Competence Research Center, University of Copenhagen, Njalsgade 88, DK-2300 Copenhagen S, Denmark.
PUB TYPE	Reports - Research (143)
EDRS PRICE	MF01/PC02 Plus Postage.
DESCRIPTORS	Competence; Foreign Countries; *Quality of Life; Self Concept; Self Concept Measures; *Self Efficacy; Simulated Environment; Social Psychology; Social Science Research
IDENTIFIERS	*Sweden

ABSTRACT

This study, which includes data collected over a 15 year period, examines to what degree Swedish citizens' judgment concerning life quality is attributed to perceptions of real or simulated models of civilization. Subjects selected for the research study included Swedish male and female teachers, and doctoral students in business administration. The research instrument used required subjects to watch a video series that presented a vision of the U.S. society during the 1970s. The subjects were then asked to respond to questions regarding how they imagine themselves living in that society. Responses were expected to reflect initial assumptions that (1) competition implies selection; (2) selection implies independence; and (3) independence implies success. The subjects' notions of himself or herself as competent and successful in the simulated situation appears to be at stake. Subjects who emerge from "certainty in preferential judgment" concerning the possibility to integrate are seen as demonstrating a fundamental psychological expression of competence. Subjects' competence is judged in terms of perceived appropriateness in ability to meet the demands of certain environments. Findings suggest that Swedish citizens imagine potential life quality within simulated society in terms relative to self-judgments regarding their own competence or success in real-life situations. (Contains 23 references.) (MM)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED 430 868

Informational Interaction with Model-Societies of Different Theoretical Orientation

Bernhard Bierschenk

1997 No. 63

SO 030 513

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY

A. Bjerstedt

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

1

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☑ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

BEST COPY AVAILABLE

2

Informational Interaction with Model-Societies of Different Theoretical Orientation

Bernhard Bierschenk

1997 **No. 63**

Cognitive Science Research

Lund University
University of Copenhagen

Editorial board

Bernhard Bierschenk (editor), Lund University
Inger Bierschenk, University of Copenhagen
Ole Elstrup Rasmussen, University of Copenhagen
Helge Helmersson (adm. editor), Lund University

Cognitive Science Research

Copenhagen Competence
Research Center
University of Copenhagen
Njalsgade 88
DK-2300 Copenhagen S
Denmark

Adm. editor

Helge Helmersson
Dep. of Business Adm.
Lund University
P.O. Box 7080
S-220 07 Lund
Sweden

Abstract

The focus of the study dealt with in the present article is on a longitudinal approach to the perception and judgement of differently founded model-societies. The reported design covers a period of 15 years and is stressing the fact that the participation of apparent dissimilar groups has made possible true experimentation as well as the validation of the approach. Study and analysis concerns the educational program, developed and commercially produced by the Biological Science Curriculum Study of Boulder, CO in co-operation with Crystal Productions of Seattle, CA. This company has produced differently coloured slide series of person-environment interactions that were built on extrapolated trends and tendencies in the USA of the 1970s. At the beginning, experimentation was firmly anchored in James J. Gibson's (1979) theory of ecological perception. Based on the two established factors, their factor-scores were used in the set-up of two test-vectors, which allowed a location of the model-societies in the measurement space in terms of their centroids. In a second step, the approach was extended to encompass the theories of discontinuity. Thus, in contradistinction to common analytical studies fairly extensive analyses of statistics were examined with a concentration on the contribution the Time-factor could make to a topological study. By means of a topological analysis it was possible to detect and abstract transformational invariants in the form of singularities. These could specify (1) the nature of change as well as (2) the identity of the affordance structure of the episodes. Its manifestation in the form of higher-order invariants has made evident that quality in a model society can be equated with perceived certainty in one's possibility of making a living in a particular model-society. On the basis of achieved remodelling transformations, it could be demonstrated that development in the perception of life quality is identical with growth in the standards of living. In contrast to the perception of the organisational layout of the model-societies, this is a perceivable event. The basic structure of citizenship seems to be preserved over changes on the global time dimension. It has been demonstrated that the evolution of quality over the covert periods has changing degrees of certainty with respect to one's possibility to gain in life quality. This means that the estimates of perception of life quality develop in agreement with the shape typical of the S-function. It follows that this development is non-linear. This justifies the topological analysis of "growth".

To explain how the Swedish citizen has developed his judgement concerning life quality attributable to real or simulated civilisations has been studied since 1981 (Bierschenk, 1987). The focus of this article is on a person's comprehension of manners, customs, fashions and privileges attributed to people living in areas with clearly marked borders concerning his co-operative interaction with a given society and its capacity of protecting one's residency. A person can achieve life quality through developing his capacity of co-operation as well as his ability of integrating cognitively various physical and social surroundings.

It is the aim of this presentation to make apparent the perception that is attracted by certain kinds of events. In undertaking the realisation of these events as well as their perception, judgement has been manifested on the basis of three different sequences of episodes, modelling modern life. These sequences refer to the program "Projections for the Future" (Lee & Mayer, 1976) which is described in the "Materials" section of this article.

A sequence of episodes is a precondition for an analysis of perception and judgement. To the degree that it can be reflected in preference statements, judgement is accessible. Further, accessibility is fundamentally dependent on the scale-ability of propositional statements, that is the chosen unit of measurement. That a viewer of the projections can make assessments on an interval scale and under experimentally controlled conditions rests on a framework that has been resolved into the following components:

(1) Frozen acts, taken from a movie version of "Projections for the Future" have been sequenced.
(2) All of the extracted acts have been framed.
(3) Each frame contains a discrete act.
(4) Through the framing each act is fixed within its series.
(5) Processing of frame by frame allows for a control of mental processing.

The components (1-5) imply that a certain concept has been encapsulated by a fixed number of pictures. An illumination of the pictures of a series one by one, makes its theoretical underpinnings apparent. Highlighted information, therefore, can be picked up only in proportion to the ecological significance of the event contained in the illuminated picture. Because the specifications are prescribed and controlled by a pre-designed stage manager, episodic pointing is fixed. A manager is administrating the pointing, which consists of an audit transition signal. This signal monitors the time course of a particular series. During the time course, the viewer is expected to interact co-operatively with the shown sequence. His task is to anticipate himself of "making a living" within the framework of the given society. The referenced class of components is expected to co-vary with the viewer's differential preferences. Accordingly, ecological significance may be picked up as "invariant combination of propositional statements at the preferred level of measurement". The quality of the process of perception and judgement is greatly improved if the preferential alternatives can be factorised.

Within the prescribed period of time, only a certain number of transactions can be carried out. Therefore, the time variable is organising the ongoing process and transforms it into a multi-step process as specified by the episode. In agreement with variables of the measuring instrument, the whole process develops with prescribed step-length. However, any transition from one statement to the next is controlled by

the trace of a design matrix, whose letter-combinations have been resolved according to the mental constraints given in Table 1:

Table 1.

Design Matrix

	Model		
Paradigm	Behaviour	Humanist	Growth
Affinity	A/B		
Structure		S/H	
Process			P/G

1. *A/B-co-variation*

For example, an event is initially shown which concentrates on a young man who is rescued from under-nourishment and who is suffering amnesia. Events successively transform the illuminated episode into a narrative of a society that is developing the functions typical of Skinner's Walden Two.

It is the paradigm of affinity that controls behaviour modification. Affinity is basic to the development of instrumental techniques for "Behaviour Modification" This model will be symbolised by the capital letter (B). The core of (B) is the assumption of a "unidirectional link" between stimulus and response or cause and effect. It is vital to judgement and evaluation that a response is retained by a reinforcement of consequences. Therefore, desired responses have to be built up by a thorough control of stimuli. In agreement with this view, the single individual in this model-society is mainly developing reactive patterns of behaviour. These patterns are emerging from different contingencies of variations and selection. It follows that behavioural development is primarily steered and controlled through techniques of punishment and reward. Development of behavioural strategies is mainly seen as a consequence of reactions to conditions in the environment.

Similarity or correspondence between two behavioural events, occurring in succession, is taken as an indication of behavioural consistency. Efficient causal statements are of fundamental import for the interpretation of stimulus arousal, e. g., of "under-nourishment" which is seen to mobilise "aggressive" energies in order to facilitate tension reduction. Its release can be the potential source of "antisocial" behaviour. Preferential judgements of this model-society concern unwanted acts. The judging person is expected to focus on the transgression and the conditions antecedent to his conduct.

Likewise, similarity concerns all members, because physical constancy in (1) apparition, (2) expressive behaviour, and (3) speech is judged with respect to phenomenological similarity. A further requirement is regularity in the behaviour setting, in which the individual is observed repeatedly. That consistency in behaviour can be improved has been basic for the interpretation of human behaviour. Because behaviour is a response to stimuli variations located outside the organism itself, behaviour has to be observed under different circumstances rather than with respect to how the individual stands in relation to others. In (B) it is non-conceivable that "personality" can exist outside the context in which its behavioural expression is transacted.

2. *S/H-co-variation*

The other example concerns a series of pictures, which concentrates on a young man who gets to know him-self and his environment with the help of people who are educating him with an eye on the highest values concerning nature and human dignity. Despite access to a sophisticated technology, ecological practices are stressed and the fundamental import of the experience of interdependency are incorporated into the events of the pictures. This model is generating the functions of society that is developing in agreement with the principles of structure. Consequently, the second cell of the trace fixes its design firmly in humanistic and ecological values.

The assumption of the existence of a priori structures in the human mind is fundamental to the operationalisation of moral conduct. Independent of any physical activity is life developing in the Humanist Model, in short the (H) model. Regardless of its appropriateness, the way in which the single individual is behaving has no explanatory value. A phenomenological world one needs to be conscious of is not assumed. In contrast to the B-model, there is no place for any commitment to constructing a "behaviour-engineering" technology.

Accordingly, behaviour is conceptualised as function of the influences that concrete facts have on the individual's perceptual ability. Assumed is a "multidirectional link" between various forces and all the phenomena, existing in the world. For their interpretation, it is assumed that a structure exists on the basis of which actions get meaning. Thus, behaviour is defined as change of state. A change in behaviour assumes the status of necessity. A change is consequently dependent on the maturity of the psychological structure, which is effected through incoming information. Those changes have been classified as more or less rational.

Similarly, behavioural changes have been established by means of changes in the structuring and re-structuring of one's "life space" (Lewin, 1963). From the behavioural point of view, rule-following behaviour is conceived of as the process of becoming mature in one's conduct. However, experience is conceived of as only helpful in structuring one's moral conduct to the surrounding world. Moral is assumed to be dependent on "Gestalt"-formation. Leaving behind one class of behaviour, from the beginning ambiguous, and adopting a new class of behaviour that owns a higher degree of form and organisation, is indicating "better" behaviour. Lower classes of conduct have ambiguous Gestalts. These are non-closed and consequently indicating unsolved problems, unfinished tasks and immaturity.

Consequently, the given problem in this model-society constitutes a particular task-environment. In order to get the Gestalts to appear and to get a new category of better behaviour that is manifesting a higher degree of moral conduct. Relations become accessible to consciousness as soon as they have become manifest.

3. *P/G-co-variation*

The third example concerns a slide series in which a young man becomes visible who is on his way to a city. However, during his journey some of the control mechanisms get out of order. Associated with it is the idea of growth, as engineers understand this concept. Consequently, the governing mechanisms and the control of continuous growth are in focus. In this series, both population and technology is growing. The effects of continuous growth are illustrated by concentrating on re-creation. It follows that this concept introduces "process" as fundamental component for the explanation of "growth", in short, exercise is basic to the (G) model. Exercising means that the organism is involved, because it is the repetition that allows the extraction and abstraction of information from observed events. Attention is dependent on ongoing

excitation and awareness implies transformation in the schematising process of the organism.

The presently occurring historical event is taken as root of the model. Assumed is a "circular link" between events. Basic to the event is its integrative condition. Despite its transient nature, this condition will alter the context of similar future events. Their incorporation (assimilation) means that valid information is mediated, but need to be conserved. Characteristic of conservation is an adjustment to the occurring event. Adjustment, however, is altering the context. This means that structural changes in cognition are dependent on composed experiences. On this basis it is possible to pick up information selectively and to accommodate on the basis of extracted or abstracted ecological significant variables.

To the individual, performing a participatory act, an event is good or bad only to the degree that it is judged to be desirable. This kind of categorical statement asserts change and novelty. Both are linking individual to its environment in an adaptive relation. However, there exists no a priori structure that can steer and control the individual's perception of his environment. Postulated is a reciprocal causation of information pick up and structural development. It follows that behavioural development is controlled through internal and external constraints. These have developed as the result of the individual's explorative behaviour.

Both the judged expression and the judge are part in the explanation. Thus, to be certain in preference of an event and to judge the event requires selective attention and structuring. Active trials have to be carried out. Otherwise is the organism unable to use the possibilities that are offered by the environment. Thus, stabilising factor in this process is the "organism" (Russel, 1948; Piaget, 1952; Brunswik, 1956). Isolated observations of events cannot contribute to the development of cognitive structure as Piaget (1952) has stated. He used the Kantian approach and introduced the "Schema" as a way of summarising repetition and conservation of activity.

It follows that experience and practice are significant components in processing a relation. They are directly connected to behavioural production and consequently a precondition for the functioning of the single individual in a complex world. As a result, formulation and testing of "hypotheses" is a means by which the single individual can adapt to the conditions that initiate information processing and new transformations. Finally, it is assumed that various events are related to each other on the basis of a time-binding function. This implies contextualisation by means of experience, but its effect is not conceived of as learning. On the contrary, it is the effect of practice that is defining behavioural and cognitive development.

These constraints are governing the individual's actions and have a key function in the relation between perception and judgement. In the conducted experiments, the participants have been required to represent themselves through the statements by adopting the role of one or the other character of a scenario. The general orientation is toward the participant's ability of demonstrating his understanding of what is right or wrong in any given society. This kind of self-extension is intimated through the following instruction and content of statements:

Instruction and Contents of the Statements:

INSTRUCTIONS

You will be shown a picture series on video presenting a vision of a modern society where current trends have been allowed to progress even further. It is intended to give

you the opportunity of imagining yourself as part of this society. You are asked to try and picture yourself in this society in such a way that you can form a clear conception of basic conditions, which would influence your life, if you were to live there. After the display, you will be asked to give an account of your situation within the society depicted. You are to evaluate a number of statements about life there. In your assessment you may want to keep in mind some events or characteristics you find worth of serious consideration. You can do this by indicating how true or untrue you think each statement is with regard to the society by giving it a grade from 0 to 9. If you think it is "very certain" you should give it a 9, whereas if you think it is "not at all certain", indicate this by giving the statement a grade of 0. The degree of truth in each statement can be expected to vary, so don't hesitate to use the entire scale from 0 to 9. Please complete your assessment fairly quickly. Try and keep up a good pace, but don't leave anything out. Avoid making unnecessary corrections.

1. I am able to travel both within the country and abroad as I please.
2. I can direct my development on my own premises.
3. My right to privacy is guaranteed.
4. I can participate freely in organised opposition to those in power.
5. I can deal with the various aspects of my overall situation without undergoing undue stress.
6. I have the possibility of adapting my life to major changes in society.
7. I can choose the job I wish.
8. I can do whatever I like, as long as I do not infringe upon the rights of others.
9. I can make an active contribution to the re-evaluation of accepted morality.
10. I can obtain the education best suited to me.
11. I encounter new technical solutions in my everyday life.
12. My position in society depends upon the educational system.
13. My health depends upon society's technological development.
14. I can realise all my material desires.
15. My status in the society depends upon my education.

These statements have been developed over a time period of about 15 years. At every test occasion, the sequence of statements has been determined on the basis of randomisation processes. Every item has been randomised for every participant and every experimental treatment. Within limits, this procedure has guaranteed the absence of systematic error variance. Recurrent factorisation of the statements, as shown in Table 2, make evident that the measurement space can be spanned and specified on the basis of two invariant scales. The first factor extracted (FI) concerns development of "Eigen-value". The other extracted factor (FII) concerns "Visibility of Social Texture".

It will be made evident that these invariants reflect the initial assumption that: (1) competition implies selection, (2) selection implies independence, and (3) independence implies success. Further, it will be shown that these assumptions have essential meaning with reference to the future. In this paper, the invariants emerging from "certainty in preferential judgement" concerning one's possibility to integrate, are taken to constitute a fundamental psychological expression of competition and success. A key position in this relation has the concept of "adaptation" (Sommerhoff, 1950), because it refers to "competence" as striking appropriateness in meeting the demands of a certain environment. As a citizen, the single individual continually is judging whether he can be certain about the conditions of competition and success in

development. The explanation, how the Swedish citizens' have developed in their judgements, is facilitated by viewing judgement of life quality as judgement of competence, because competence is best comprehended as manifested "effectiveness" which is a behavioural quality.

Table 2.

Reproduced Factor Structure

	1988		Feb-1997		May-1997	
Item No.	Factor I	Factor II	Factor I	Factor II	Factor I	Factor II
01	.86	*	.72		.80	
02	.85		.82		.85	
03	.81		.83		.82	
04	.81		.78		.86	
05	.79		.55		.63	
06	.77		.69		.69	
07	.76		.69		.81	
08	.73		.80		.80	
09	.73		.72		.80	
10	.69		.77		.77	
11	*	.76		.75		.79
12		.75		*		.55
13		.70		.76		.74
14		.61		.59		.59
15		.61		Missing		Missing

* Suppressed loading around zero (< 0.30)

Within the given model-societies, the rationale for constructing a particular society is represented by means of agreed-upon conceptualisations concerning a society's view on rules. It may be noted that rule-following behaviour concentrates on "Competition". Variations from one society to the other concern the perception of those antecedent processes that is leading to the conceived laws. "Success", on the other hand, is conceived of as carrying the information characteristic of a particular quality of life. Consequently, a model-society is defined as a structured combination of active elements that collaborate in governing the formation of a response. Now, the crucial question is whether or not any significant relationship is implied in the concept of adaptation.

Method

Participants

The degree of impression is estimated on the basis of non-verbal preferential reports. The goal is the estimation of error variance in the participants' impressions. However, evaluation of a preference for one or the other society is restricted by the capacity of a single participant in adopting. It is expected that a participant is adjusting to the laws and regulations of the particular society. At a minimum a common similarity analysis must be carried out, if preference judgements shall be compared. Moreover, if and to what extent possible future conditions have been

influencing the given assessments can be studied only by observing the participant's competence as reflected through judgement or choice behaviour.

Materials

Selection of the material has been made on the assumption that competent people have integrated experiences with various social systems or can integrate the experience they are making with those systems. "Projections for the Future" is an audio-visual slide series that provides a unique frame of reference. As a means for fostering perceptual competence, it is manifesting various degrees of success-competition interactions. Produced by the Biological Science Curriculum Study of Boulder, CO in co-operation with Crystal Productions of Seattle, CA., its task is to portray it according to common understanding: This can be expressed with Kohn (1986, p. 22), who stated the following:

"To compete is to strive for goals, to learn competence, to reach for success. Without competition, even minimal productivity, to say nothing of excellence, would disappear".

The company has developed differently coloured slide series for educational use. Individual-environment interactions were built up on extrapolated trends and tendencies in the USA of the 1970s. These projections are aimed at attracting the attention of High-school students to fundamental macro conditions of survival. According to the producers' intentions, the materials at hand is confronting the potential viewer with in-built components that more or less closely correlate with some basic concepts of science. These are expressed as (1) Behaviour-Modification or Connectivity, (2) Humanism or Evolution, and (3) Growth or steering and control of economic and technological/industrial processes (Lee & Mayer, 1976).

Based on this material, a goal of primary interest concerned the experimental separation of the two factors mentioned previously. Factor (FI) is of major import because it relates to perceived involvement to the first discrimination function. This means that perceived involvement or success is operating in the determination of personal growth. Factor (FII) is associated with the second discrimination function. This accounts for personal competition as force, which is assigning each person his place in a given social system. This means that the function is related to statements about sufficiency in obtaining means for making a living.

It is the single individual, that is a token of the kind of biological systems, whose activity is producing "citizenship". As far as the causal determination of its adaptive activity is concerned, it is important to note that Tables 11 and 12 allow the calculation of their discriminatory power. The first manipulative variable amounts to ($\eta^2 = .86$), which implies a correlation of ($r_c = .93$). The second manipulative variable represents also substantial discriminatory power which equals to ($\eta^2 = .34$). This implies a correlation of ($r_c = .59$). The degree to which the weighted combination of both can serve as predictor of the focal condition is indicated by ($\eta^2 = .56$).

It is worth noting that discrimination by means of "Success" is parasitic on "Eigen-value" while discrimination by means of "Competition" is parasitic on "Visibility of Social Texture". As shown, two scales comprise the imagined alternatives and are expected to reflect variations with respect to the target "establishment of perceived life quality". This principle of constructive conduct may be comprehended as the generative principle of the test vector. Thus, a reciprocal causation is anticipated concerning information pick up and its comprehension.

Design and Procedure

In selecting and assigning participants to different treatment combinations, it has been necessary to arrange for some restrictions. When any single participant is treated repeated times, it becomes obligatory to control the treatment effects. According to Cox (1958), the natural choice is a Latin square of the type set up in Table 3.

Table 3.

Latin Square for Four Groups of Observers and Four Sequences of Treatment

	Order			
Group	1	2	3	4
1	Behaviour	Sweden	Humanist	Growth
2	Humanist	Growth	Behaviour	Sweden
3	Growth	Humanist	Sweden	Behaviour
4	Sweden	Behaviour	Growth	Humanist

As shown in Table 3, every treatment appears once in a row and once in a column. The entry "Sweden" refers to an approach, which has become known as the "Swedish Model". However, a certain kind of ambiguity is associated with this model. Though it can be disambiguated and made known "by association". Thus, it is possible to determine its boundary conditions by relating the models of Table 3 in correspondence with similarity in rating. It follows that treatment control concerns the number of rows and columns. Both row and columns have been randomised and the distinct set of treatments has been restricted to the same number as there are numbers of rows and columns, namely four. Thus, the experimental units are grouped in two dimensions (Cox, 1958, pp. 40-44). In carrying out this design, it is necessary to arrange for several session meetings of about 15 minutes.

Three to four observations per cell would be sufficient in the definition of the sources of variation. However, higher numbers have been available. A comparison of the mean observations made on a cell takes mean values and marginal values into account. It follows that this kind of repeated-measures design implies the exposure of any single participant to all treatment conditions. Unlike simple between-groups variance analysis, the p-values on the original and transformed data can be "wildly discrepant or even bizarre" (Abelson, 1995, p. 61). However, a transformation of the gathered data guarantees a sharp increase the validity of the F-test. F-tests in this kind of design are highly vulnerable to violations of its underlying assumptions (Winer, 1971). With reference to previous studies (Bierschenk, 1988b), it is reasonable to assume that treatment and grouping of Table 3 does not interact. This observation allows for an estimation of factorial interaction of the main effects. Even under such extreme conditions as one observation per cell, the estimation can be carried out.

However, if only one observation is made, error variances can be estimated by using factor interactions. Contains the interaction a real effect will the standard deviation rise significantly and in proportion to the size of the effect. The result is an overestimation of the error with respect to the main effect and the interaction effect of lower rank. However, orthogonal effect-contrasts and least square estimations of the given marginal means allow an analysis of variance (ANOVA). It follows that ANOVA can serve in the estimation of the standard error of the standard deviation.

Then, the residual terms of the design account for all sources of variation in the scales. This is so due to treatment effects that are not predictable from the sum of the main effects. In the present situation, the Latin square constitutes a useful approach, because it is expected that its dimensions show negligible interactions.

Procedure in 1981

From the procedural point of view, it is important to mention that the idea for the videotaped materials grew out of a symposium on the theme: Ways of Mankind – Exploring Human Science. Referring to the primary intent, given in the descriptions of the materials, 'Projections for the Future' has been developed as an instrument for educators. In testing and evaluating the theoretical significance of the ideas explored, it was a good starting point to begin with those teachers and students that were enrolled in the programs of teacher education in Sweden. On the basis of the videos teachers should be able to introduce students to contemporary concerns with both the scientific and the social dimensions of civilisation. Teachers and students were given an opportunity to explore the integration of new scientific ideas and techniques into the value and belief system of society.

It follows that the intention of the producers was of particular import to the study. Consequently, both "student-teachers" of the School of Education in Malmö and all last-year High-school students of its Training-Gymnasium were invited to participate in the study of 1981 according to the design matrix of Table 4. In the initial study (Bierschenk, 1987), which was carried out in 1981, the mean value of a cell in the design matrix shown in Table 4 is ($a_{ihj} \propto 20P^0, 3S^1, 4E^0, 6O^0$). The complexity of this pattern is best scrutinised through a slicing (h) of the data-box by means of a MANOVA approach that allows the overall analysis of the variances and co-variances of groupings shown in Table 5.

Table 4.

Platform of the 1981-Design

	Mean	Order			
Grouping	Obs.	1	2	3	4
Social Science-Teacher	28.3	S	B	H	G
Humanities-Teacher	28.3	S	H	G	B
Natural Science-Teacher	28.3	S	G	B	H
Special $Teachers_{21}$	21.5	S	B	H	G
Special $Teachers_{22}$	21.5	S	H	G	B
Special $Teachers_{23}$	21.5	S	G	B	H
Special $Teachers_{11}$	21.5	S	B	H	G
Special $Teachers_{12}$	21.5	S	H	G	B
Special $Teachers_{13}$	21.5	S	G	B	H
Humanities-Stud.	19	S	B	H	G
Social Science Stud.	19	S	H	G	B
Natural Science Stud.	19	S	G	B	H

$_{21}$ Group C and D of Second Term, $_{22}$ Group E and F of Second Term, $_{23}$ Group G and H of Second Term; $_{11}$ Group 3 and 4 of First Term, $_{12}$ Group 7 and 8 of First Term, $_{13}$ Group 5 and 6 of First Term

Order: (B) Behaviour, (H) Humanist, (G) Growth, (S) Sweden.

Table 5.

Design Matrix of the Statistical Analysis of the 1981-study

	Group					
Model	1	2	3	4	5	6
Behaviour	1	2	3	4	5	6
Humanist	7	8	9	10	11	12
Growth	13	14	15	16	17	18
Sweden	19	20	21	22	23	24

Group: (1) Male Special-School Teacher (n = 37), (2) Male Subject Teacher (n = 36), (3) Female Special-School Teacher (n = 92), (4) Female Subject Teacher (n = 49), (5) Male High-School Student (n = 21), (6) Female High-School Student (n = 36).

In concluding, this measure allows for the control of age as a possible confounding factor. The statistical procedures followed in the analysis are of a multivariate kind. In order to answer the question whether and to what degree group differences are present in the data-box, the multivariate generalisation of ANOVA allows for a localising of the groups in a multidimensional measuring space, which initially had been specified by three factorised scales.

The first hypothesis (H_1) tested was formulated as follows:

H_1: The populations have a common dispersion, which means no group deviations.

Because H_1 was accepted, it was also possible to state the absence of interaction effects and to use the output of a MANOVA as input in Cooley and Lohnes (1971, pp. 299-323) FACDIS program. With the output of this program, it could be decided upon the second hypothesis (H_2).

H_2: The test-vectors are discriminative of the environments.

By following up the second hypothesis, it was concluded that interaction effects were absent. Further, it could be stated that the discriminating functions behaved orthogonal. Finally, negligible group effects strengthened the already overwhelming treatment effect even more.

Starting point for the multivariate "lay-out" of the experimental approach of Table 4 is a data-aggregation on the basis of Cattell's data-box. Its import for the structuring data has been discussed in Bierschenk (1971). Patterns and mechanisms, or organisms are attributable to the N-component of the area described the N x n matrix. From a mathematical point of view (N) is always a vector. Comparing persons, for example, implies comparing inter-individual differences over intra-individual differences. It follows that the upper case 'N' stands for the objects of measurement in the basic matrix of the layout, as shown in Table 6.

Is a particular effect generating inter-individual differences, it can be concluded that a construct has come into existence. Thus, scaling preferences has to be made dependent on some of the relations shown in Table 6. A relationship is described completely by an entry into the data-relation-matrix that has 10 indices, namely $A_{P_i}P'_i$, $S_nS'_n$, $A_jA'_j$, $E_eE'_e$, $O_wO'_w$. It is common that the cause or condition

has no clear-cut origin, because experimenters, working with traditional cross-sectional and cross-level designs, have difficulty in giving plausible explanations to observed differences. However, in a multivariate approach, measures can be taken that help in the clarification of the sources of variation. Generation of stability in the data-box can be achieved by collapsing certain dimensions and by sampling over others.

Table 6.

Data-Relation-Matrix

Component	Time	Condition
Participant	P_l	P'
Stimulus	S_n	S'
Response	A_j	A'
Environment	E_e	E'
Observer/Occasion	O_w	O'

The dimensionality of a component under consideration can be marked easily by attaching a superscript. If the condition of a component is indicated by zero, it has the function of a scalar. At the beginning of the development of a scale composed of 20 items for example, this would be indicated by ($20S^0$). On the other hand, has this scale been factorised and the result is a scale consisting of three factors, this would mean that the linear or statistical test-vector would be shown by ($3S^1$). Thus "Time" of Table 6 indicates the size of a component while "Condition" indicates its dimensionality.

Procedure in 1986

Enriching the study of life quality with a design that allowed the collection of preference data by students of economics and industrial development had become a possibility in 1986. Within the framework of the graduate program at Lund University, the present author set up a required methods-course on data collection and analysis in the Department of Business Administration. In this course the participating students were assigned the role of being the "experimenters" who are responsible for data collection and analysis. The design of Table 3 could be realised during the first term of the academic year of 1986. The procedure that governed the data collection phase is given in Table 7. In the beginning of the methods course the doctoral students worked with dictionary definitions they had to transform into preference statements. This measure was taken as a precaution in the construction of propositional statements.

In analogy with the 1981-study, their attention was focussed on the effects that the assumptions of analytical reasoning and positivism could have on their working with a prescriptive approach toward an operational definition of "worthiness and welfare" related to society. Judgements on the pre-designed statements of preference had to be collected from those persons they could convince to participate in their study. Because the design had to control the goodness in the data collection, it is worth noting that both its row and columns were randomised. It turned out that this measure was a prospective move in guaranteeing the soundness of further statistical processing.

The two participants, working as High-school teachers, had the opportunity to contribute with three classes of High-school students (n = 60), enrolled in the programs of economics, social sciences and humanities at a Gymnasium in Malmö.

Table 7.

Platform of the 1986-Design

	Order			
Experimenter	1	2	3	4
1	H	S	G	B
2	G	B	H	S
3	B	G	S	H
4	S	H	B	G

Order: (B) Behaviour, (H) Humanist, (G) Growth, (S) Sweden.
Experimenter: (1) Consumer-Client Enterprise (n = 1),
(2) High-School Teacher (n = 2), (3) Bus. Adm. Teacher (n = 2),
(4) Bus. Adm. without teaching obligations (n = 2).

One participant had his own enterprise within the branch of consumer service and advertisement. He was able to convince clients (n = 10) participate in his data collection. Two participants gathered data from the lower grade University-students they were teaching (n = 60). Finally, the two doctoral students, who had no teaching obligation at that time, were referred to gathering of data from volunteering students (n = 50, inclusive part-time students, students of Law and Civil Engineering as well as members of the technical staff of the Department of Business Administration).

The mean value of a cell in the design matrix shown in Table 6 is ($a_{ihj} \propto 45P^0$, $2S^1$, $4E^0$, $4O^0$). After data collection the attention of the "Student-experimenters" was turned toward learning to understand the meaning of the factor structure of their pre-designed preference statements. In this connection the import of Marker-variables was stressed. Their significance in a backward report on the data structure was repeatedly pointed out. Continuity in the meaning of the many new observations of the present study was the insight gained. A small set of linear variable combinations (the factors) controlled their reproduction. A summary of this and the previous study has been published in the European Journal of Political Economy (Bierschenk, 1988a)

Since the variables with an orientation toward some primary needs showed no or only very weak correlation with the third factor of the 1981-study, a two-factor solution turned out to be the set of combinations that best carried its predictive validity. Based on the two established factors, their factor-scores were used in the set-up of two test-vectors for discrimination between the model-societies. This measure allowed their location in the measurement space in terms of centroids that were discriminated as efficient as in the 1981-study. Thus, the second study confirmed the sense-making test-vectors. They were correlated mainly with the first discrimination function. Thus far, this function accounted for over 60% of the variance in the scales.

Procedure in 1988

As the result of the methods-course, a physical link had been established between the 1981- and the 1986-study. In consequence of this result, a new methods-course was announced and data collection, according to Table 8, started at the second term of the academic year of 1988. The reputation of the course attracted doctoral

students from the Department of Business Administration as well as from the Department of Industrial Organisation at the Technical University of Lund.

Table 8

Platform of the 1988-Design

	Order			
Experimenters	1	2	3	4
1	H	S	G	B
2	G	B	H	S
3	B	G	S	H
4	S	H	B	G

Order: (B) Behaviour, (H) Humanist, (G) Growth, (S) Sweden.
Experimenters: (1) Business Administration, $Växjö_1$, (2) Business Administration, $Växjö_2$, (3) Business Administration, Lund, (4) Industrial Organisation, Lund.

Furthermore, students of Business Administration enrolled in the doctoral program of the Växjö-College, 130 miles off, were admitted. The maximally allowed students were limited to eight participants. Thus the course was filled. However, this time the participants were assigned the experimenter role pair-wise, which has been indexed with a superscription.

The task concerning that part of the course that focussed on item construction was altered. Statements had to be formulated in order to capture the critical attributes of competition for economic and technological growth. Other facets of interest to the students were education as pathway to economic prosperity as well as justice as expression of equality of opportunity. On the basis of the previously and newly constructed statements, the "Experimenters" conducted their data collections.

The contributions of preference data made by these students came exclusively from lower grade students who were enrolled at their home institutions. Thus, the result of the actual data collection is composed of 80 lower grade students at Lund University as well as 80 lower grade students at the Växjö-College. The mean value of a cell in the design matrix shown in Table 8 is ($a_{ihj} \propto 40P^0, 2S^1, 4E^0, 4O^2$). Especially the segment of the Växjö region has broadened the basis of the study, because these subjects are contributing with experiences from physical and social surroundings that are expected to differ from the experiences made in a city-milieu.

In disregarding the rank of the factor model for the given measurement data, the number of factors retained amounts even in the present case to two. The argument for this factor structure is that it is evidently invariant and that the factors are working parsimoniously in a sense-making location of the environments in the measurement space. In noting that weighted test-vectors of the present study performed even better compared to the previous studies, it is taken as evidence for the discriminating power associated with the first function.

In summing up the 1988-study, it can be concluded that the realness of the differences among the mean-vectors of the previous studies has been enhanced substantially by the participants of the methods-course. In confirming the hypothesis pursued, 79% of the variance in the data-box could be explained.

Procedures in 1997

The achieved experimental results suggested that this strategy could be valuable in conducting an experiment in the educational milieu of a Gymnasium of the city of Lund. Absence of randomly equivalent assembles, and a modification of the Latin Square of the previous studies had shaped the platform of two studies carried out in 1997 as shown in Tables 9 and 10.

Table 9.

Platform of the February 1997-Design

	Order			
Group	1	2	3	4
1	S	B	H	G
2	S	H	G	B
3	S	G	B	H
4	S	G	H	B

Order: (B) Behaviour, (H) Humanist, (G) Growth, (S) Sweden.
Group: (1) Natural Science (NV3a, n = 26 of 32),
(2) Natural Science (NV3c, n = 25 of 28),
(3) Social Science (SP3b, n = 26 of 28),
(4) Art (ES3b, n = 24 of 27).

Table 10.

Platform of the May 1997-Design

	Order			
Group	1	2	3	4
3	G	H	B	S
1	G	B	H	S
4	H	G	B	S
2	B	H	G	S

Order: (B) Behaviour, (H) Humanist, (G) Growth, (S) Sweden.
Group: (1) Natural Science (NV3a, n = 24 of 32),
(2) Natural Science (NV3c, n = 24 of 28),
(3) Social Science (SP3b, n = 24 of 28),
(4) Art (ES3b, n = 23 of 27).

The 1997-studies were planned and executed in co-operation with a Gymnasium in the City of Lund. The experimental design developed thus far is especially attractive in this context, because the subject-teacher, who conducted the experiment, had scheduling control over a few naturally aggregated groups, but could subdivide the participating classes neither for presentation of the treatments nor for testing. The mean value of a cell in the design matrix shown in Table 9 is ($a_{ihj} \propto 24P^0$, $4S^1$, $4E^0$, $4O^2$).

By counter-balancing this design it is shown the degree of control achieved in the educational setting. In Table 10, the employed Latin square has been altered with respect to sequencing of the treatments. The mean value of a cell in the design matrix

shown in Table 10 is ($a_{ihj} \propto 23P^0, 4S^1, 4E^0, 4O^2$). Had a fully controlled experiment been feasible, the source of both main and interaction effects would have been removed or at least been kept within the range of sampling error.

A possible source of effects, confounded with the grouping, is the effect associated with specific sequences of treatment. However, when some replications of ($4E^0$) are assigned differently, for example "Sweden" is always placed in the first or alternatively in the last position, the Latin square becomes more specific and the systematic effect of a specified sequence can be controlled and if necessary eliminated.

This procedure has been repeated several times, i. e. in the studies of 1981 and 1997. Thus, it could be ruled out the possibility that a specific systematic interaction effect was producing an apparent main effect. The extreme importance of replicating the experimental design with different Latin squares has been pointed out by Campbell and Stanley (1963, p. 222). These authors are of the opinion that this measure is changing the quasi-experimental design of the Latin square into a true experiment.

As was shown in Table 1, a caesura of nine years had not changed the factor structure in any important way. One heavily weighing argument for approaching students of a Public Gymnasium was intimately connected to the target audience envisioned by the producers of the materials. Concerning the measurement procedures, the third tested hypothesis (H_3) was the following:

H_3: The factor structure obtained in 1988 is reproducible.

That the factor structure of 1988 could be confirmed lends heavy support to its realness as indicator of societal preferences and its usefulness in an investigation of perceived success and competition in the judgement of developed life quality.

Results

Before considering further statistical discrimination and control, it is worth noting that the initially anticipated discrimination is associated with "Eigen-value" and "Visibility of Social Texture". These constructs represent the variables of the measurement set that has been used in setting up the test vectors. It may also be noted that the effects associated with the final test occasion may be attributed to the introduction of the new item of Table 2. Thus far, the discrimination of the model-societies has produced the centroids shown in Table 11. These estimates develop in agreement with the shape typical of the S-function. This justifies the topological analysis of "growth". Successive contextual encapsulation of the process of perception and judgement is presented in Table 12.

However, the effects of competition and success are nesting the model-societies in a manner that is highlighting the development of discrimination and judgement over 15 years. Analysing the centroids within the framework of the General Linear Model (GLM) is a natural extension of ANOVA, because GLM like a MANOVA, takes into account the positive correlation ($r = .60$) between the two functions. The appropriate statistical procedures have been carried out with MINITAB (1996), Release 11 for Windows 95. The results show significant effects only for the Time-factor. Its significance allows a study of the model-societies within the framework of process analyses.

Table 11.

Accumulated Centroids of the Discrimination Functions

Model	Function 1	Function 2	Year
1	0.64	-0.73	03/1981
2	0.81	0.66	03/1981
3	-0.76	0.22	03/1981
4	-0.69	-0.15	03/1981
1	-1.12	0.08	03/1986
2	0.41	-0.87	03/1986
3	-0.35	0.28	03/1986
4	1.06	0.51	03/1986
1	-1.51	0.06	03/1988
2	0.87	-1.31	03/1988
3	0.92	0.74	03/1988
4	1.56	0.63	03/1988
1	1.65	1.29	02/1997
2	0.75	1.35	02/1997
3	1.08	1.27	02/1997
4	0.82	1.28	02/1997
1	1.32	3.23	05/1997
2	1.04	3.14	05/1997
3	0.92	2.81	05/1997
4	1.97	3.87	05/1997

Table 12.

GLM: Development of Model-Society Discrimination over Time

Factor	Levels	Values				
Occasion	5	03/81	03/86	03/88	02/97	05/97
Model	4	1	2	3	4	
Functions	2	1	2			
Source	DF	Seq. SS	Adj. SS	Adj. MS	F	P
Occasion	4	31.4724	31.4724	7.8681	11.18	0.000
Model	3	1.8541	1.8541	0.6180	0.88	0.463
Functions	1	1.2145	1.2145	1.2145	1.73	0.199
Error	31	21.8213	21.8213	0.7039		
Total	39	56.3623				

How contextual effects have been influencing the course of conduct will be discussed. This discussion presupposes that higher order functions of structure need to be picked up during the development of a path. Here, the notion "structure" refers primarily not to the constructed model-societies, but to the perception of the architectural configuration of their components. One can not point to these components. Therefore, it is always necessary to display their organisational layout.

Thus, structure is not used merely to make reference to stability in perception and judgement. In its most general meaning, structure refers to "life quality" associated with the model-societies. From a perceptual point of view, the quality in an action may remain stable over long periods of time or it may change from moment to moment, but its change depends on the transformational characteristics of ongoing processes of person-environment interaction.

The presented experiments have all been designed and conducted on the basic assumptions of classical experimentation. With those prerequisites the experimental treatment is under control, but the interaction effect has been left unaccounted. It is generally agreed upon that perception and judgement (i. e. behaviour) is regulated by integrated feedback (Held & Hein, 1958) rather than through immediate effects. However, feedback mechanisms cannot be built into the classical design. It is therefore impossible to account for informational invariants or ecological significance, because these exist only over time.

As Shaw and McIntyre (1974, p. 309) have concluded: "... it is not surprising that theorists, who study discrete cross-sectional segments of information processing fail to find them, and therefore deem them be of little importance". Their statement implies that the problem with the classical approach lies in the analytic treatment of "quality". However, the given definition of "quality" explicitly recognises the fact that information pick-up and quality are interacting and that all changes over time are to be regarded as process.

It follows that abstracted relations gradually develop into operative structures that become progressively differentiated and integrated. As a matter of fact, its evolutionary and consequently synthetic quality requires the formal application of a "topological approach" of the form presented in Bierschenk (1990). By liberating the assumption of classical test theory, the specificational aspect of the mentioned dependency (non-linear) relation is now associated only with (-) and (+) signs. It should also be mentioned that the involved transformation is guided by a counter-clockwise rotation. Biological mechanisms at the micro-ecological level are endowed with the ability to change the orientation of a path through counter-clockwise rotation. Figure 1a-e is an example of the transformational effect of this measure at the macro-ecological level.

Figure 1a-e contains the description of the developed discrimination. The dynamics in the phase space of Figure 1 makes evident the complementary role that shifts of viewpoints (i. e. variability) have in relation to persistence in perspective (i. e. invariability). Some cognitive mechanisms need to exist in a process that is twining together the variable with the invariable. In Figure 1a-e, the fifth and final attractor, represents the achieved empirical expression. It is an invariant description of perceived life quality associated with the context of judgement of the Swedish Model.

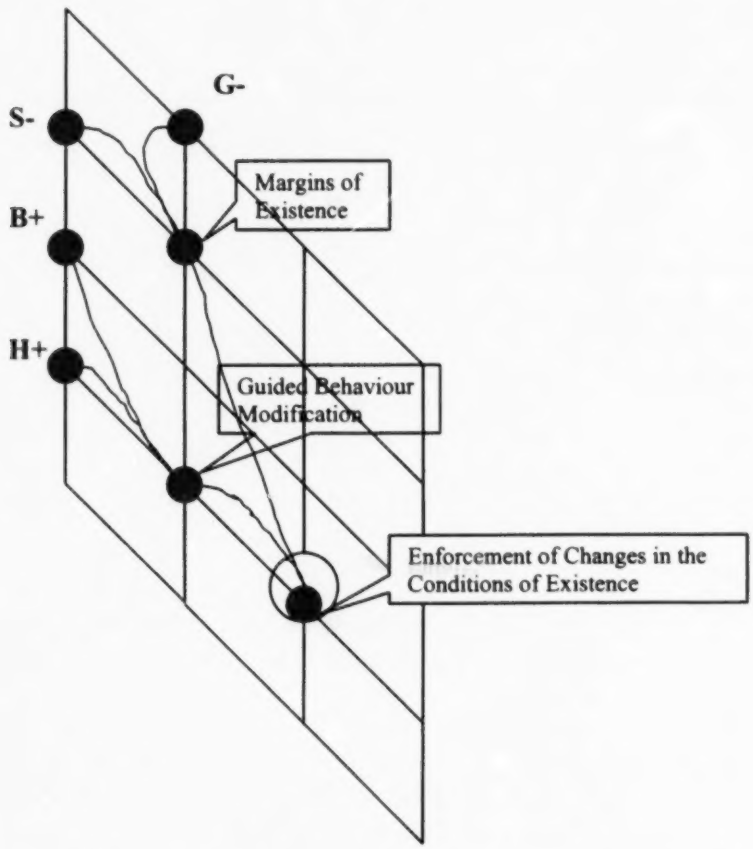
Gibson, Reynolds, and Wheeler (1969) have argued that an observer can directly perceive what comes in and goes out of view as opposed to what is going or coming out of existence. It follows that wilfulness is balanced by an "ego-orientation" encompassed in the terminal states. Moreover it can be postulated that this reciprocal relation is fundamental for the establishment of meaning carried by the model-societies. This is a Kantian postulate, which presupposes that the product of schematising is imagination, which can be equated with his notion "Einbildungskraft". Further, Kant used this notion as an expression of potential or wilfulness, necessary in transcending series of instances, which he calls "Segmente einer Zeitreihe". It is easily concluded that the degrees of certainty in the perceiver's

shifts of orientation and transformational integration are forming and are formed by the order of the terminal states.

As shown in Figure 1a, in contextualising their behaviour, the participants of 1981 have given attention to power planning in the form of social and environmental engineering. In an important way, these participants have been constraining their accommodation in favour of the Behaviour and the Humanist Models.

Figure 1a.

Holotop of the Ordered Model-Societies of 1981 as Terminal States



It follows that a power elite has been anticipated and its representatives have been associated with the function of channelling the planning and exercise of power. In general, the participants seem to accept that their status derives from the "idea" on the basis of which co-operation between individuals is established in the model-societies. Establishing and enforcing interactive behaviour of co-operating individuals means that the power is generated by which co-operation is maintained and co-operative policy formulated.

However, the rejection of the Growth Model together with the Swedish Model may be viewed as charging the ideological premises of the Swedish Model with the significance attributed to social and environmental engineering. In the view of 1981, the Swedish Model deviated from its characteristic "Middle Way" and moved toward individualism. It is apparent that the participants of the 1981-study must have been

influenced by events of significance for their attitudes to the model-societies. The established effects place the "Swedish Model" into the same space as the Growth Model, namely on the side of uncertainty. Common to both models is that they are perceived with reference to the idea that the individual responds with "perfect foresight" to economic incentives and deterrents. Moreover, it is believed that strategies of behaviour develop on the basis of rational decision-making. In the eyes of the participants in 1981, this kind of policy can have only limited success.

Relative in-elasticity to the requirements of growth and limited success in changing energy-related behaviour appears to have caused their downgrading. Concerning large-scale power supply, uncertainty in its processing must have been interconnected along with two "crises". The first crisis was caused by the oil-embargo in 1973 and the second one was associated with environmental pollution. Moreover, during the 1970s, scarcity in oil and natural gas together with an economic and industrial recession has made it necessary to adjust one's preferences. Production and consumption was no longer in balance.

Moreover, during the 1980s are a number of de-valuations of the Swedish currency diminishing profit. This circumstance had changed the conditions of living and consequently, the Swedish Model lost in visibility of its social texture. Higher inflation rates, lost income and unemployment made it less attractive. Simply stated, the pressure of change had been too low in Sweden. In the absence of a pressure to remove the deficiencies in effectivity and savings a negative correlation between education and income had evolved. Stated with reference to the Growth Model, there has been too much of regulations and too many protected economic and industrial sectors.

In discussing this outcome with a Kantian perspective, it is obvious that natural developed societies are marked by complexity with respect to the dependency relations that exist between persons, objects and events. Though, the Swedish Model has moved toward the Growth Model, whose concepts are concrete. Because these are fully synthetic, they yield completeness and particularity. It follows that closeness between both models can be utilised in an effort to remove the unnamed and consequently formless, unknown, and ambiguous aspects of society.

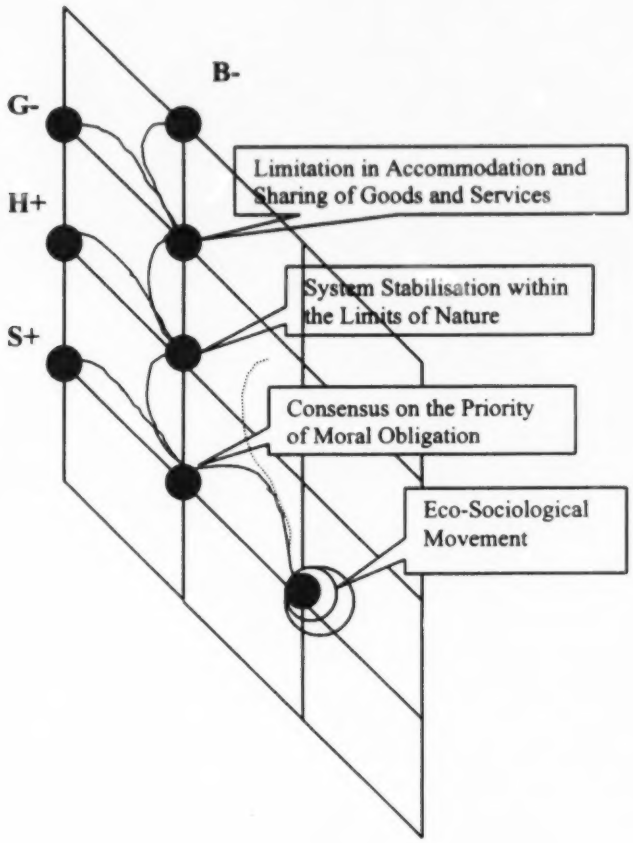
In manifesting the development of a path, connecting lines have been used with the purpose to demonstrate that ecological significant informational invariants exist only over time. Thus meaning is arising only at the edges where a preceding state becomes transformed by its successor. Resulting is structural transformation and the emergence of a singularity. This is a topological invariant that helps in demonstrating that super-ordinate components can be extracted at certain stages of the experimental series. Their naming communicates the evolutionary meaning of the established time function. So defined, a "concept" is qualitatively different from a construct and need not be established in entirety to be active part in an evolutionary process.

As demonstrated in Figure 1b, the qualification of this function is formally expressed by means of the dashed line, which is connecting Figure 1b with Figure 1a. The emergent equilibrium is expressing a preference for a different course of action. Preferred now is the "Eco-Sociological Movement", because this movement could prevent power planning as major instrument of force. For the participants of the 1986-study, the simplicity inherent in an "Enforcement of Changes in the Conditions of Existence" lost its attractiveness in the transition from 1981 to 1986. Thus, the single individual acted no longer as associate of a collective, but did act as responsible agent, who repudiated the determination of the agreed course.

As shown in Figure 1b, the idea of "Limitation in Accommodation and Sharing of Goods and Services" is fundamental to the treatment of nature. In 1986 appeared an accentuation of the human dimension paired with the operative strategies of development. Basic became the necessity of support of the systems of nature.

Figure 1b.

Holotop of the Ordered Model-Societies of 1986 as Terminal States



It follows that the focus was on environmental adaptation. This could be achieved on the basis of a re-cycling economy. Consequently, the mental input was governed by a perceived need for validation and maintenance of the stable regimes of nature.

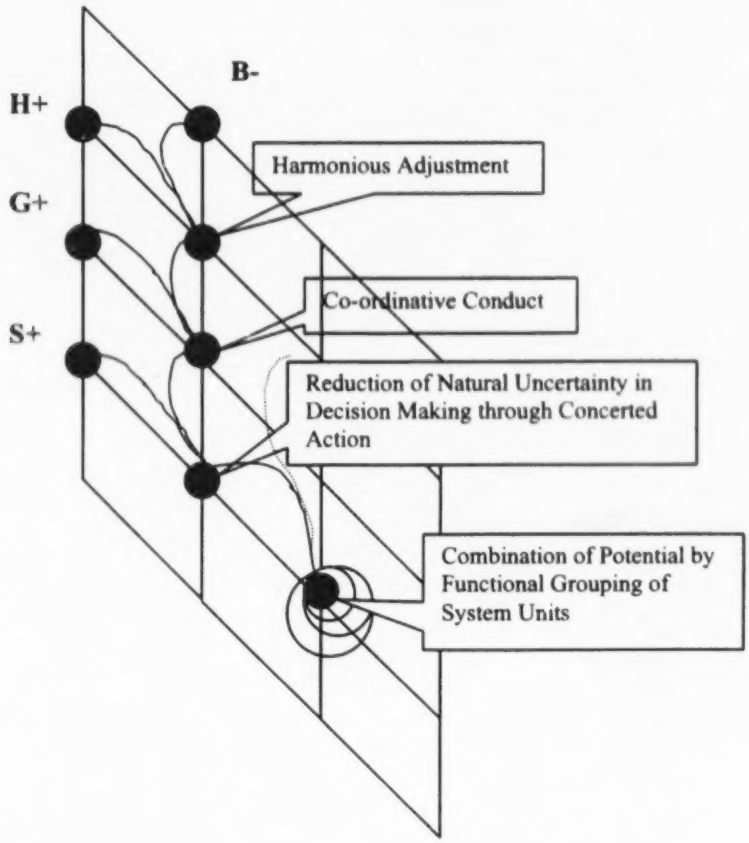
What the preferred concept of "Evolution" seems to offer is an awareness of needed system changes. In establishing a consensus on the existence of certain limits of nature, these changes could be brought about. Thus, more attention is paid to the development of mental structures that were products of learning experiences and the experience of practice. Life quality was conceptualised as result of a particular task-orientation and achievement of integrated experiences. Uniqueness in outlook and the communication of ideas with those who did hold the same general outlook had gained import.

Figure 1c is reflecting the resulting impact on perception and judgement of the participants of the 1988-study. The pressure to compete must have made a certain

impact, because it was perceived that some serious work with a modernisation of the Swedish Model had been initiated.

Figure 1c.

Holotop of the Ordered Model-Societies of 1988 as Terminal States



Some globalisation pressures appeared to be at work. Environmental pollution on a global scale required a "Harmonious Adjustment" to the condition of concern to the participants of the 1988-study. In general, this implied that these participants showed particular sensitivity in picking up environmental information on local and global changes. As a result, a profoundly new quality had emerged. Certainty in judgement was relating the Humanist Model and the Growth Model to the Swedish Model. In the judgement of innovation, human development was given priority within the framework of steering and control. It follows that morality is conceived of as factor that in agreement with Sperry's (1983) assertion had to govern science and technology. This mental enforcement had great impact on the development of "Co-ordinative Conduct". A sense of local and global responsibility came in focus.

For the sake of environmental protection, an operative strategy for balancing economic-technical growth could be "Reduction of Natural Uncertainty in Decision Making through Concerted Action". This implied the development of a new means for successful adaptation to the new situations arising out of the second crisis. Transformational changes of the preferences bring the "Combination of Potential by

Functional Grouping of System Units" into play. Technical activities and financial investments had to be subordinated to human values. Social validation of "Monitoring" became a fact.

Despite raised consumer taxes and increased acceleration in the rates of inflation as well as further decreases in real income, the Swedish Model gained in 1988 even more attractiveness compared to the preferences given in 1986. During this two-year period, a commitment to secure resources and to assure a regeneration process seemed to be a powerful source. Regulatory changes made by Government had been judged to be a necessity in the harmonisation of economic with ecological goals. Given the perceived need of energy conservation, rising unemployment rates and devaluation of the Swedish currency with over 26% had no influence on the attractiveness of the Swedish Model. The whole nation accepted the "Eco-Sociological" codex. Despite difficulties involved with this "green-red"-coalition, it was expected that economic development would lead to a new "green budget". The key-function in this development was a new group identity through which this change could be validated.

The condition of perceived wholeness and the awareness of implicate order is important in 1988. This condition is only partly of physical and social kind. That these participants had perceived specific physical and social variables and judged them as positive properties of the Swedish Model seems reasonable to assume. When these properties were integrated cognitively, the Swedish Model gained significance with respect to its competitive value. It follows that participation and interaction with the Swedish Model was more easily differentiated and judged more positively. In the light of the second crisis, its conditions had moved through re-evaluation. Seven years after the first study, a new sense of justice and selective attention to the distribution of goods and services had produced a 180° rotation in judgement. Thus, a major transformation occurred with respect of what could be expected and accepted socially concerning economical and technological growth.

Both the Humanist Model and the Growth Model were transcended and were influencing the perception of the Swedish Model. Model diversification seemed to bring a precautious optimism into action. Wilfulness had changed toward a new adaptive capacity to adjustments. Moreover, the pressure to compete and to invest globally seemed to drive the Swedish Model into the main stream of activities that can ensure survival in a global economy. A new life quality seemed to emerge through ecologically responsible and Market-sensitive enterprising, which seemed to be quite independent of national boarders and narrow budget considerations.

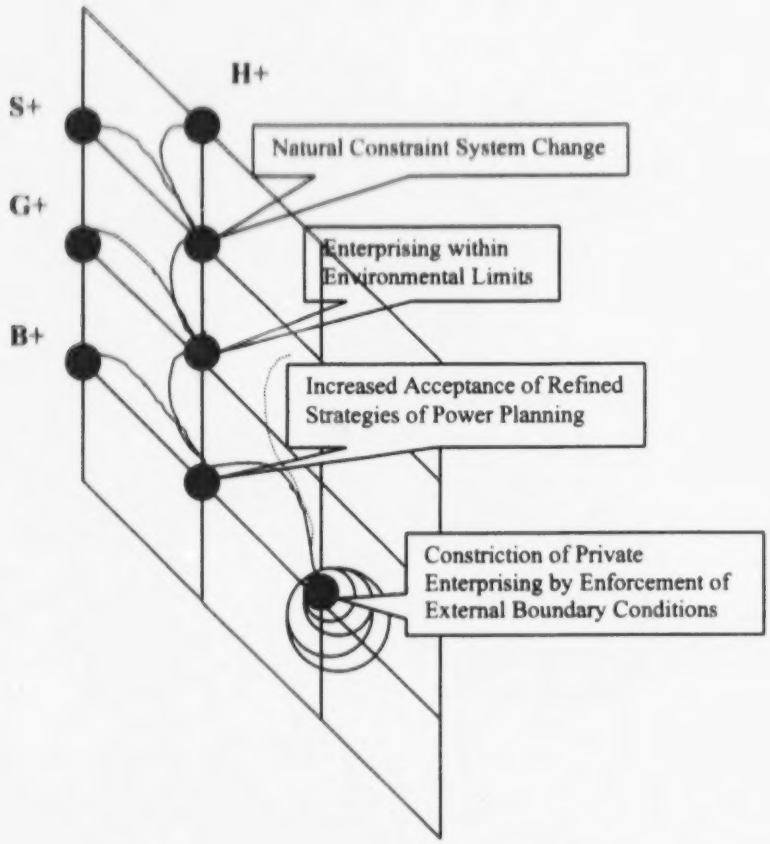
Finally, a stronger functional link to the characteristics of both model-societies is transmitting the observed cognitive shift. This shift seemed to make the participants of 1988 less vulnerable to various indicators of crisis. A successful change had occurred toward the development of coping strategies for stressful life events. From the material point of view a mental transformation toward self-organising secured a synergy effect. This self-organising function seems to guide and control effectively perceived possibility of transaction.

As demonstrated in Figure 1d, these routines are seen to co-operate favourably with the refined routines of monitoring, characteristic of the Behaviour Model. Compared to the preceding judgements of the Behaviour Model, higher degrees become discernible in the February-study of 1997. This factor performs the classification function of selection. An extension of this preference had influenced the judgement of the Swedish Model. In the February-study is the monitoring factor conceived of as particular of the Swedish Model. More advanced conditions of

production had produced a spin-off effect in technical development, which required a higher degree of monitoring which could be achieved by means of higher administrative effectivity. In approaching the general orientation in Figure 1d, "Natural Constraint System Change" is valued.

Figure 1d.

Holotop of the Ordered Model-Societies of Feb-1997 as Terminal States



Higher ratings of the Behaviour Model are indicative of a perceived ability to relate one's special achievements to "Increased Acceptance of Refined Strategies of Power Planning". However, constructive incorporation of the other model-typical patterns of interaction is pointing toward relativity in judgement. Its most characteristic aspect is its stress on "Enterprising within Environmental Limits" and a need of transcendence. This need has mentally enforced a functional "contextualisation" which involves all model-societies. This result may be an indication of an effort to overcome competence deficits, but it may equally well be indicative of such a deficit.

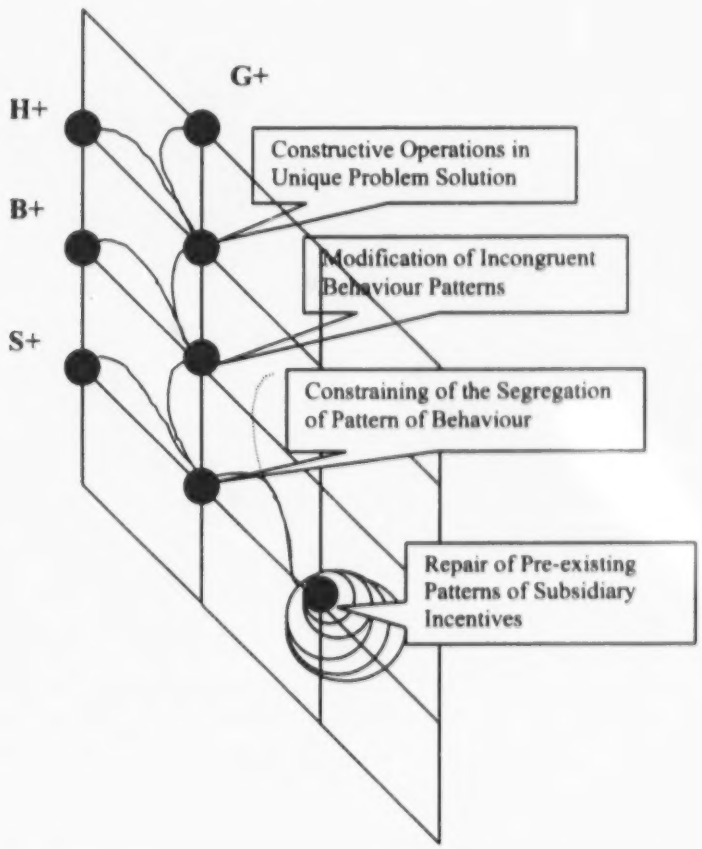
On the other hand, this kind of effectivity had no strengthening effect on the capacity of mental transformation. In a particular way, the participants appeared to be affected, because they seemed to have gained insight with respect to the wholeness of the Swedish Model. It appeared a rise in sensitivity toward the necessity of successful enterprising and acquaintance with environmental conditions. This kind of perceptual

shift may have facilitated their comprehension of improvement in planning and needed organisational changes. Concerned affirmative action is in focus of the participants. As perceived and judged in the February-study of 1997, success and competition appears to resemble some of the discriminations made in 1981.

Then and now, the ratings are in favour of the Behaviour Model. In an effort to change the conditions that govern the standards of living the Behaviour Model is the instrument. Compared to the Swedish Model, the Behaviour Model is conceived of as superior in monitoring the acquisition of skills that enable any one to make a living, because it achieves a "Constriction of Private Enterprising by Enforcement of External Boundary Conditions". As demonstrated in Figure 1e, this singularity has been confirmed in the May-study of 1997.

Figure 1e.

Holotop of the Ordered Model-Societies of May-1997 as Terminal States



This insight (singularity) did not automatically lead to deeper mental structures or any elaborated conceptualisation of the Swedish Model. On the contrary, refined routines had as its effect a higher degree of acceptance of governmental steering and control. This prevented further departure from the "Middle Way" as the agreed code. It prevented also creativity and constructive thinking. From the administrative and technical point of view, the Swedish Model performed its tasks to a high degree in agreement with the accepted condition of the "Middle Way". Thus,

the orientation is toward familiar principles of classification. According to own needs and knowledge, the single individual has only small or at least very few possibilities of structuring information.

It follows that the participants in the May-study of 1997 could show only marginal changes in preference. Management of the single individual through familiar organisational principles is still the preferred alternative. In systems theoretical terms, the Swedish Model is conceived of in similar terms. It is common understanding that strategies of production need to be developed in close association. Being in agreement, in accord or in harmony with authority, or authorised strategies of action is the binding state. Successive introduction of new industrial and ecologically sensitive production lines as well as highly differentiated work functions is based on partial authorisation. As far as it concerns the human factor, grouping the individual by necessity concentrates on work differentiation and education.

Responsibility for special purposes is determining the Swedish Model. However, task-responsibility is possible only to the degree that it is in accord with an authorised plan, for example a budget plan. Over and above what may be called routine actions, effectivity seems to be a function of one's potential of controlling one's associates or fellow citizens. This stress on qualification rather than on competence is the accentuated condition. Solidity in the production of services depends on the achieved state of binding. In turn this implies a limit on one's possibility of acting successfully on a free and global market.

Discussion

A precondition for the present study has been the feasibility of setting up a design that allowed the distinction and abstraction of regularities in change. The study is founded on the assumption that a conceptualisation of life quality is based on dynamic and abstract relations. The basic idea of experimenting with model-societies is the existence of boundary conditions or terminal states that determine life quality. This means that the individual's experiences of life quality can successively be integrated into a structure. In accord with one's fundamental outlook, interaction with a certain event sequence is the prerequisite for perception and judgement of life quality in various model-societies. Development and expression of judgement means that it is related to apparent forces that are operating over time. It follows that the concept of "quality" can develop only to the degree that it is governed by a higher order function. However, these functions need to be conceived of as emergent properties.

Identification of higher order functions requires that the perceiver can cope with complex events and consequently with change. Therefore, the experiments carried out were put into a longitudinal framework, whose goal was to examine the perceptual effect of the time dimension. On the basis of achieved remodelling transformations, it could be demonstrated that development in the perception of life quality is identical with growth in the standards of living. In contrast to the perception of the organisational layout of the model-societies, this is a perceivable event. The basic structure of citizenship seems to be preserved over changes on the global time dimension. By means of Figure 1a-e, it has been demonstrated that the evolution of quality over the covered periods has changing degrees of certainty with respect to one's possibility to gain in life quality.

The conditions, governing the emergence of the first singularity, are the proper starting-point. When an intuitive awareness of possible "chains of catastrophic events" is envisioned, the requirement of flexibility toward changing conditions is the

appropriate response. Possible but yet not realised mental and physical strains have formed the first global singularity:

(1) Enforcement of Changes in the Conditions of Existence.

This singularity encompasses a capacity for individual development and growth. Through a wilful co-ordination of interest, various agents and agencies seem to have achieved a conceptual integration that implied the forming of a new potential in the shape of the second global singularity:

(2) Eco-Sociological Movement.

In a time of crises, this was an unusual performance. It generated the understanding of a regime that could transform perceived stress. This stress had its source in a globalisation of economy, but could be transformed successfully into a consensus policy as expressed in the third global singularity:

(3) Combination of Potential by Functional Grouping of System Units.

However, conceived violations of achieved consensus required a certain measure of safeguarding the standards of living. Consequently, life quality seemed to depend on a perceptual sequencing that could be conceptualised into the fourth global singularity:

(4) Constriction of Private Enterprising by Enforcement of External Boundary Conditions.

This type of development implies envisioned exercise of "Sovereignty", that could take a lead in the prevention of anxiety causing events. Asserting security of public savings seemed to mean that wealth could be distributed through an increasing "Public Sector" and higher values of welfare could be projected. The purpose with this kind of affirmative action is to release the single individual from worries about the future. Transformed by the developing process, this constraint generated the fifth and final singularity:

(5) Repair of Pre-existing Patterns of Subsidiary Incentives.

A consensus that is intimately related to a utilitarian understanding of justice, namely equality in the distribution and consumption of goods and services is the formal expression. High degree in certainty of secured welfare is a most typical characteristic of comprehended growth in the standards of living. Included in this comprehension is the requirement of high-level safekeeping stipulations in order to guarantee freedom from danger and hazard of life.

References

Abelson, R. P. (1995). *Statistics as principled argument*. Hillsdale, NJ: Erlbaum.

Bierschenk, B. (1971). *Att strukturera olika datanivåer med hjälp av faktoranalystekniker (Structuring various data levels using factor-analytic techniques)* (Kompendieserien, No. 12). Malmö: School of Education

Bierschenk, B. (1987). *Perception of quality of life* (Kognitionsvetenskaplig forskning, No. 16). Lund: Lund University. (ERIC Reproduction Service, No. ED 282 892, TM 870 265).

Bierschenk, B. (1988a). A theoretical basis for estimating quality of life. *European Journal of Political Economy*, *4*, 323-332.

Bierschenk, B. (1988b). *The visual cliff transformed. A factor-analytic definition* (Kognitionsvetenskaplig forskning, No. 25). Lund: Lund University. (ERIC Document Reproduction Service, No. ED 340 712, TM 013 836)

Bierschenk, B. (1990). *The topological scaling of consciousness. The world in the perspective of economists and technologists* (Kognitionsvetenskaplig forskning, No. 34). Lund, Sweden: Lund University. (ERIC Document Reproduction Service, No. Ed 336 335, SO 030 280)

Brunswik, E. (1956). *Perception and the representative design of psychological experiments*. Berkley, CA: University of California Press.

Campbell, D. T., & Stanley, J. C. (1963). Experimental and quasi-experimental designs for research on teaching. In N. L. Gage (Ed.), *Handbook of research on teaching* (pp. 171-245). Chicago, IL: Rand McNally.

Cooley, W. W., Lohnes, P. R. (1971). *Multivariate data analysis*. New York: Wiley & Sons.

Cox, D. R. (1958). *Planning of experiments*. New York: Wiley & Sons.

Gibson, J. J. (1979). *The ecological approach to visual perception*. Boston, MA: Houghton Mifflin.

Gibson, J. J., Kaplan, G. A., Reynolds, H., & Wheeler, K. (1969). The change from visible to invisible: A study of optical transitions. *Perception & Psychophysics*, *5*, 113-116.

Held, R., & Hein, A. (1958). Adaptation of disarranged hand-eye co-ordination upon re-afferent stimulation. *Perceptual and Motor Skills*, *8*, 87-90.

Kohn, A. (1986, September). How to succeed without even vying. *Psychology Today*, pp. 22-28.

Lee, A. E., & Mayer, W. V. (1976). *The program guide to projections for the future*. Boulder, CO: Biological Science Curriculum Study.

Lewin, K. (1963). *Feldtheorie in den Sozialwissenschaften*. Bern: Huber.

Minitab Inc. (1996). *Minitab reference manual*. State College, PA: Minitab.

Piaget, J. (1952). *The origins of intelligence in children*. New York: International University Press.

Russell, B. (1948). *Human Knowledge: Its scope and limits*. London: George Allen and Unwin.

Shaw, R., & McIntyre, M. (1974). Algoristic foundations to cognitive psychology. In W. B. Weimer, & D. S. Palermo (Eds.), *Cognition and symbolic processes* (pp. 305-362). Hillsdale, NJ: Erlbaum.

Sommerhoff, G. (1950). *Analytical biology*. London: Oxford University Press.

Sperry, R. W. (1983). *Science and morality priority*. Oxford: Basil Blackwell.

Winer, B. J. (1971). *Statistical principles in experimental design* (2nd ed.). New York: McGraw-Hill. (Original work published 1961)

Author Note

The study has been carried out as a co-operative effort between Lund University, Sweden, and the University of Copenhagen, Denmark: Copenhagen Competence Research Centre (CCRC) which is organisationally associated with the Psychological Laboratory.
The present article has been prepared with financial support from the Danish Research Councils.
Correspondence concerning this article should be addressed to Bernhard Bierschenk at the Copenhagen Competence Research Centre, Copenhagen University, Njalsgade 88, Dk-2300 Copenhagen S, Denmark. Electronic mail may be sent via Internet to BERNHARD@axp.psl.ku.dk.